

Serial No. 10/648,805

Attorney Docket No. 14-018-RCE3

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FEB 09 2009

LISTING OF CLAIMS:

1. (Currently amended) A creep drive control device configured to execute, when a driver of a vehicle does not have either an intention to accelerate the vehicle or an intention to maintain stopping of the vehicle, at least one of adjustment of a braking force and adjustment of a driving force applied to the vehicle so as to execute ~~a control~~ predetermined control cycles such that a vehicle speed becomes a value within a fixed range with an upper limit of range, wherein an upper limit of the fixed range does not exceed 10 km/h, and such that the speed of the vehicle becomes a predetermined target speed, wherein

the creep drive control device includes:

a brake pedal operation amount sensor for detecting an operation amount of the brake pedal in every predetermined control cycle;

a target speed calculation unit for calculating a target speed value in every predetermined control cycle based at least on the detected brake pedal operation amount and a preset relationship between the target speed value and the amount of brake pedal operation, so that the target speed value is repeatedly calculated in accordance with the detected brake pedal operation amount; and

a target speed setting unit for setting the target speed value calculated by the target speed calculation unit as the target speed; and

~~the target speed is calculated in accordance with a driving operation of the driver during the control;~~

Serial No. 10/648,805

Attorney Docket No. 14-018-RCE3

~~there is a the preset relationship between the target speed value and a degree of the brake pedal depression wherein operation amount is that the greater the degree amount of brake pedal depression operation is, the smaller the target speed is, and value is~~

~~the target speed is repeatedly calculated in accordance with the driving operation in a predetermined control cycle.~~

2. (Currently amended) A creep drive control device comprising:

an engine output control unit configured to control an engine output in accordance with an engine control amount;

a braking force control unit that is configured to control a braking force applied to each wheel in accordance with a brake control amount;

an acceleration intention determination unit configured to determine whether a driver has an acceleration intention;

a stop maintenance intention determination unit configured to determine whether the driver has a stop maintenance intention;

a target speed calculation unit for calculating a target speed value in predetermined control cycles;

~~a target creep speed setting unit configured to set a target creep speed, wherein the target creep speed is calculated in accordance with a driving operation of the driver during a control;~~

a vehicle speed acceleration unit configured to set a vehicle speed by at least one of increasing the engine output and decreasing the braking force;

Serial No. 10/648,805

Attorney Docket No. 14-018-RCE3

a vehicle speed deceleration unit configured to decrease a vehicle speed by at least one of decreasing the engine output and increasing the braking force;

a brake pedal operation amount detection unit-sensor for detecting an operation amount of a brake pedal in every predetermined control cycle;

a starting assistance control unit which, when a result of a determination by the acceleration intention determination unit and a result of a determination by the stop maintenance intention determination unit are negative, configured-is configured to operate using a creep driving mode in which the following occurs:

the target creep speed setting unit decreases the target creep speed when the operation amount of the brake pedal increasesspeed calculation unit calculates the target speed value in every predetermined control cycle based on a preset relationship between the brake pedal operation amount, which is detected by the brake operation amount sensor, and the target speed value, so that the target speed value is repeatedly calculated in accordance with the detected brake pedal operation amount;

the preset relationship is that the target speed value decreases as the brake pedal operation amount increases;

the target speed setting unit sets the target speed value as the target creep speed;

the vehicle speed acceleration unit is operated when the vehicle speed is less than a first target vehicle speed, and the first target vehicle speed is smaller than the target creep speed; and

the vehicle speed deceleration unit is operated when the vehicle speed is larger than a second target vehicle speed, and the second target vehicle speed is larger than the target creep speed, and

Serial No. 10/648,805

Attorney Docket No. 14-018-RCE3

~~the target creep speed is repeatedly calculated in accordance with the driving operation in a predetermined control cycle.~~

3. (Previously presented) The creep drive control device according to claim 2, wherein the acceleration intention determination unit is configured to determine that the driver has the acceleration intention when a shift position of an automatic transmission is set to a drive operable position by the driver, and when the acceleration intention determination unit is configured to detect at least one of an accelerator opening being equal to a predetermined amount, the vehicle speed being equal to or above a predetermined value, and the drive of the vehicle being controlled by an automatic driving control other than the control executed by the starting assistance control unit.

4. (Previously presented) The creep drive control device according to claim 2, wherein the stop maintenance determination unit is configured to determine that the driver has the stop maintenance intention when the stop maintenance determination unit detects at least one of setting of a shift position of an automatic transmission to a drive inoperable position by the driver, execution of a brake operation that generates braking force capable of causing stop maintenance of the vehicle, and execution of an automatic stop control that automatically stops the vehicle.

5. (Currently amended) The creep drive control device according to claim 2, wherein the target creep speed setting calculation unit is configured to set the target creep speed value by

Serial No. 10/648,805

Attorney Docket No. 14-018-RCE3

correcting a pre-set reference creep speed in accordance with at least one of a driving state of the vehicle and a road surface condition.

6. (Currently amended) The creep drive control device according to claim 5, wherein the target creep speed setting calculation unit is configured to execute correction such that the target creep speed value becomes larger as an accelerator opening becomes larger.

7. (Canceled)

8. (Currently amended) The creep drive control device according to claim 5, wherein the target creep speed setting calculation unit is configured to execute a correction such that the target creep speed value, when the vehicle is moving in a backward direction is direction, is smaller than the target creep speed value when the vehicle is moving in a forward direction.

9. (Currently amended) The creep drive control device according to claim 5, wherein the target creep speed setting calculation unit is configured to execute a correction such that the target creep speed value becomes smaller as a distance becomes smaller between the vehicle and an obstacle in a forward direction of the vehicle.

10. (Currently amended) The creep drive control device according to claim 5, wherein the target creep speed setting calculation unit is configured to execute a correction such that the

Serial No. 10/648,805

Attorney Docket No. 14-018-RCE3

target creep speed value becomes larger on a road with a downward gradient, and the target creep speed value becomes smaller on a road with an upward gradient.

11. (Currently amended) The creep drive control device according to claim 5, wherein the target creep speed setting-calculation unit is configured to execute a correction such that the target creep speed value becomes larger in accordance with a length of continuation of a state in which the braking force generated by the braking force control unit is equal to or above a predetermined value.

12. (Currently amended) The creep drive control device according to claim 2, wherein the target creep speed setting-calculation unit is configured to set, when a deviation between a present vehicle speed and the target creep speed value is larger than a predetermined value, a new target creep speed value that is the sum of the present vehicle speed and a value that accords with the deviation.

13. (Previously presented) The creep drive control device according to claim 2, wherein the vehicle speed acceleration unit is configured to increase the vehicle speed by increasing the engine output after decreasing the braking force.

14. (Previously presented) The creep drive control device according to claim 2, wherein the vehicle speed deceleration unit is configured to decrease the vehicle speed by increasing the braking force after decreasing the engine output.

Serial No. 10/648,805

Attorney Docket No. 14-018-RCE3

15. (Previously presented) The creep drive control device according to claim 14, wherein the vehicle speed deceleration unit is configured to decrease the vehicle speed by decreasing the engine output, and following this, increasing a gear ratio of a transmission.

16. (Previously presented) The creep drive control device according to claim 2, wherein the vehicle speed acceleration unit is configured to increase the vehicle speed by at least one of being configured to set a second engine control amount with which the engine output is controlled by the engine output control unit as the sum of the engine control amount and an engine control increase amount, and being configured to set a second brake control amount with which the braking force is controlled by the braking force control unit as the brake control amount minus a brake decrease amount.

17. (Previously presented) The creep drive control device according to claim 2, wherein the vehicle speed deceleration unit is configured to decrease the vehicle speed by at least one of being configured to set a second brake control amount with which the braking force is controlled by the braking force control unit as the sum of the brake control amount and a brake control increase amount, and being configured to set a second engine control amount with which the engine output is controlled by the engine output control unit as the engine control amount minus an engine decrease amount.

Serial No. 10/648,805

Attorney Docket No. 14-018-RCE3

18. (Previously presented) The creep drive control device according to claim 16, wherein the creep drive control device is configured to respectively set the engine control increase amount and the brake control increase amount in accordance with a deviation between the vehicle speed and the target creep speed.

19. (Previously presented) The creep drive control device according to claim 18, wherein the creep drive control device is configured to respectively correct the engine control increase amount and the brake control increase amount in accordance with at least one of a driving state of the vehicle, a road surface condition, and a driving operation of the driver.

20. (Currently amended) The creep drive control device according to claim 16, wherein the creep drive control device is configured to set the brake decrease amount by correcting an amount that accords with a deviation between the braking force that accords with the brake control amount and a braking force that accords with ~~a brake~~the brake pedal operation amount, using at least one of an accelerator opening and a road surface coefficient of friction.

21. (Currently amended) The creep drive control device according to claim 17, wherein the creep drive control device is configured to set the engine decrease amount by correcting an amount that accords with a deviation between the vehicle speed and the target creep speed, using at least one of ~~a brake~~the brake pedal operation amount and a road surface coefficient of friction.

Serial No. 10/648,805

Attorney Docket No. 14-018-RCE3

22. (Previously presented) The creep drive control device according to claim 2, wherein the vehicle speed acceleration unit is configured to limit the engine control amount such that the engine control amount is equal to or less than an upper limit value.

23. (Previously presented) The creep drive control device according to claim 22, wherein the vehicle speed acceleration unit is configured to execute a correction of the upper limit value in accordance with at least one of a driving state of the vehicle, a road surface condition, and a driving operation of the driver.

24. (Previously presented) The creep drive control device according to claim 16, wherein the vehicle speed acceleration device is configured to execute a correction such that the engine control increase amount becomes smaller in either one of a case that the vehicle speed is a value proximate to zero, and a case that a gradient of a road surface is a downward gradient.

25. (Currently amended) The creep drive control device according to claim 16, wherein the vehicle speed acceleration unit is configured to execute a correction such that the engine control increase amount becomes smaller in accordance with any one of an accelerator opening becoming smaller, a ~~brake~~ the brake pedal operation amount becoming larger, and a road surface coefficient of friction becomes smaller.

26. (Previously presented) The creep control device according to claim 22, wherein, when the vehicle speed acceleration unit is configured to limit the engine control amount to

Serial No. 10/648,805

Attorney Docket No. 14-018-RCE3

being equal to or less than the upper limit value, the vehicle speed acceleration unit is configured to suspend engine output control when the vehicle is either one of stationary and moving in a direction opposite to a direction of travel of the vehicle, and along with this, the starting assistance control unit is configured to cause the braking force control unit to generate a stop maintenance braking force for stop maintenance of the vehicle.

27. (Currently amended) The creep drive control device according to claim 17, wherein the vehicle speed deceleration unit is configured to execute a correction such that the brake control increase amount becomes larger in accordance with any one of an accelerator opening becoming smaller, a ~~brake~~ the brake pedal operation amount becoming larger, and a road surface coefficient of friction becoming larger.

28. (Previously presented) The creep drive control device according to claim 17, wherein the vehicle speed deceleration unit is configured to execute a correction such that the brake control increase amount becomes larger when a gradient of a road surface is a downward gradient.

29. (Previously presented) The creep drive control device according to claim 16, wherein, when the vehicle speed increases following a decrease of the engine output by the vehicle speed deceleration unit, the braking force control unit is configured to switch the wheel to which the braking force is applied during a period in which the braking force is applied.

Serial No. 10/648,805

Attorney Docket No. 14-018-RCE3

30. (Previously presented) The creep drive control device according to claim 16, wherein the braking force control device is provided with a first braking unit that is configured to apply braking force to each wheel, and a second braking unit that is configured to apply braking force to each wheel independently of the first brake unit, and when the vehicle speed increases following a decrease of the engine output by the vehicle speed deceleration unit, the braking force control unit is configured to switch between generation of the braking force by the first braking unit and generation of the braking force by the second braking unit, during a period in which the braking force is applied.

31. (Previously presented) The creep drive control device according to claim 2, wherein the starting assistance control unit is configured to cause the engine control amount to change such that the engine control amount agrees with an amount that accords with an accelerator pedal operation amount of the driver, when the creep driving mode is completed.

32. (Currently amended) The creep drive control device according to claim 2, wherein the starting assistance control unit is configured to cause the brake control amount to change such that the brake control amount agrees with an amount that accords with ~~a brake pedal operation amount of the driver~~ the brake pedal operation amount, when the creep driving mode is completed.

33. (Previously presented) The creep drive control device according to claim 1, wherein the creep drive control device includes a hydraulic brake device in which a master cylinder pressure, which is generated based on operation of a brake pedal, is transmitted to wheel

Serial No. 10/648,805

Attorney Docket No. 14-018-RCE3

cylinders, and the creep drive control device is configured to execute the control without transmitting the master cylinder pressure to the wheel cylinders.

34. (Previously presented) The creep drive control device according to claim 2, wherein the creep drive control device includes a hydraulic brake device in which a master cylinder pressure, which is generated based on operation of a brake pedal, is transmitted to wheel cylinders, and the creep drive control device is configured to execute the control without transmitting the master cylinder pressure to the wheel cylinders.

35 (Currently amended) The creep drive control device according to claim 2, wherein the control is executed such that the vehicle speed becomes a value within a fixed range with an upper limit of range, wherein an upper limit of the fixed range does not exceed 10 km/h.